Montana Shared Catalog Network Support Project June-Sept. 2007

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Introduction

In the interest of establishing and maintaining the highest possible performance of the Montana Shared Catalog, the Montana State Library (MSL) contracted myself, Brian Fish, to perform a series of visits to Shared Catalog member libraries across Montana. The goals of these visits were to document and evaluate the libraries' computer hardware and network/internet connectivity, in order to make recommendations for improvement where possible. Establishing reliable and responsive performance of the Workflows Staff Client software has been of primary importance, with encouraging results.

This report details the general course of the work performed this summer, and the resulting improvements and recommendations.

Description of Work Performed

I maintained a standard procedure for each library visit, with the goal of diagnosing all possible problems and ascertaining the best available avenues for improvement. At each site I began by speaking with library staff, familiarizing myself with their computers and network environment, and inquiring about any recurring issues or questions. Following these discussions I inspected each site's network, both physically and via software, including the following tests:

- Bandwidth, packet loss, and latency tests via DSLReports.com
- Additional packet loss tests to alternative sites, including testing to MSL
- Performed simple Workflows tasks from my laptop, establishing a baseline for comparison against local libraries' workstations
- Flooded connections, up and down, with TCP and ICMP data to stress-test Workflows' connection to MSL
- At libraries with public wireless internet access, checked availability of bandwidth-intensive peer-to-peer file sharing connections (Essentially all libraries allowed P2P connections.)

Following these tests I addressed any problems either brought up by library staff or discovered during testing. In most cases these problems were straightforward and easily remedied; the few issues that couldn't be resolved were generally problems with the Workflows software itself, and are detailed below.

Finally I cataloged the hardware specs (CPU, RAM, Operating System, Hard Disk, Network Connectivity) of all staff and public access machines, and documented the results of network testing.

Results and Recommendations

General Observations

- **Bandwidth:** From objective observations it seems Workflows' connection is stable on physical connections of 1Mbit downstream and 512Kbit upstream or higher. On connections with lower bandwidth, floods of TCP data (which simulate one or more large file uploads/downloads or similar tasks) could consistently knock Workflows offline by lagging its connection to MSL.
  It should be noted that the requirement of 1Mbit/512Kbit may increase as bandwidth-intensive application use increases, such as the increasing popularity of streaming internet video, or introduction of audiobook downloads.
- **Workstation RAM:** RAM is significantly overlooked in many current computer installations, and the MSC libraries show this trend. While Microsoft Windows' and other applications' demands for CPU speed, bus speed, and disk space have largely stagnated for the last few years, memory requirements constantly go up. Windows XP alone, without applications running, can use 300-400Mb of RAM, depending on hardware drivers. Thus any Windows XP computer will show significant performance improvements with RAM upgrades up to 1Gb, and may take advantage of even more RAM if several applications are frequently used at once. Many machines may seem slow enough to warrant replacement, but could be viable for a few years to come with just a memory upgrade. This is particularly the case for public-access computers, which have minimal CPU and disk requirements.
- **Windows Vista:** Should be avoided. Microsoft's latest operating system is still very immature, creating many more problems than would be encountered running Windows XP. Additionally, inhomogeneity (running multiple OS versions on various computers)

greatly increases the probability that any problems that can be encountered will be, and increases the knowledge needed by staff to support the various systems. Windows Vista will be worth using eventually, but I recommend continuing to purchase systems with Windows XP pre-installed (or Mac OS X, or some Linux distributions) for the moment. Vista will likely be ready for production environments in another year or two, or around the time its first Service Pack is released.

- **Userful Linux:** Userful provides two installation options; clients may purchase computers from Userful which come pre-installed with Userful Linux, and are generally setup with multiple keyboards, mice, and monitors, so that one computer may act as two to six public access stations. Additionally, clients can purchase Userful Linux to install on computers they already own. It seems the client experience is polarized along these two options: libraries with multi-head public access stations purchased from Userful had consistently positive experiences, while those who tried to use Userful's software on their own hardware universally regretted it. In the case of Userful's multi-head computers, they are clearly a cost-effective way to add a bank of public computers, and their software is sufficient and easy to administrate, generally immune to viruses and spyware. Unfortunately, Userful's software has inconsistent support for clients' hardware, and when problems come up, Userful support tends to blame the user first, as I understand it.
- **User Support:** I heard consistently positive sentiment about the capability of the MSL staff, who are greatly appreciated and respected. However, I heard two issues regarding user support mentioned more than once: communication in general, and support for "minorities", such as school libraries. Regarding communication, some of the MSC librarians are simply not technically-minded, and may, for example, find tasks such as a new Workflows update daunting, despite the fact that they've completed such tasks before. While avoiding patronization, it may be helpful to "spell it out" more when sending out instructions for updates, configuration changes, and other tasks. Additionally, some libraries that don't quite "fit the mold" expressed frustration that their special needs were sometimes difficult to get addressed. Mostly this refers to school-specific support.

Security

- **Workflows Logins:** MSC libraries' logins and passwords are predictable to the extent that I stopped asking shortly into the summer, generally guessing each library's login information. The Workflows client is used widely enough that intruders could certainly find a copy with persistence; packet inspection at any library could provide them with that library's authentication info, and the similarity of all MSC libraries' logins would give them unfettered access to most Montanan's library records, including the ability to modify or delete them with impunity. While the regularity of these logins certainly brings some convenience for MSC administrators and librarians, there is a double-edged nature that should be considered.
- **Public Wireless Access:** Libraries can provide their patrons with an extremely valuable service by providing wireless access, but again this introduces some small dangers. In certain configurations patron's computers are added to the network on equal footing with library workstations, potentially giving them access to shared documents or other temptations. However, nefarious users are still rare in Montana, and few libraries I visited had documents or other resources available on their networks. My suggestion here is to use wireless routers when providing wireless access, as opposed to wireless access points. A router performs address translation, somewhat isolating the wireless users from the network it is attached to, including preventing them from easily browsing the library's network. An access point, on the other hand, connects wireless users as if they had physically plugged into the network. To a dedicated and knowledgeable intruder the router would be only an inconvenience, but the goal is to keep honest people honest. Worrying about truly skilled intruders is a task for professional administrators, and not likely to be a common problem around Montana for the moment.

Library-specific Comments

The majority of the MSC libraries I visited had very strong internet connectivity, with good bandwidth, consistent throughput, and no packet loss. Among these, packet loss is clearly Workflows' worst enemy, but is also the rarest ailment encountered.

- **Bigfork Library:** Bigfork Library's internet connection is via a directional wireless link across Flathead Lake. Links of this nature are often subject to throughput degradation and packet loss in adverse weather, and it sounds like this is sometimes the case in Bigfork, especially in the winter. Unfortunately, this may be the only option for the near

future for broadband access in Bigfork, but if an affordable landline became available, it would certainly improve wintertime connectivity.

- **Marion Branch Library and Twin Bridges Library:** Marion's and Twin Bridges' staff machines are connected via wireless, as were a few other Workflows machines I encountered this summer. These machines all exceeded my expectations for Workflows performance, but weren't bulletproof. Moving these machines to wired connections is probably only necessary if performance degrades in the future.
- **Dillon, Meagher County, Big Timber, and Plains Libraries:** These libraries had the lowest tested bandwidth among the libraries I visited (see appendix), and were the most susceptible to network traffic (such as a large file download) interrupting Workflows' connection. In some cases these libraries simply have the fastest affordable connection, however they should attempt to get at least 1Mbit downstream as it becomes practical.
- **Thompson Falls High School:** TFHS was experiencing an ongoing problem with Checkout and Discharge wizard events causing Workflows to hang for several minutes. Thanks to a tip from Jess Tobin, we found that this was being cause by Workflows attempting to play nonexistent sound files. If anyone else encounters this problem, disabling these sounds in the Checkout and Discharge wizard properties is an effective solution.

Unresolved Issues

- **Bigfork Elementary - Mac bug:** Bigfork Elementary has four relatively new Apple computers running Mac OS X. Of these, Workflows runs very well on two, while it crashes during startup on the other two. From the configurations of the various machines, it appears that CPU architecture, RAM available, installed updates, Java version, and connectivity method are all unrelated to the problem. I obtained relevant Java console output for this problem, and Mike Price has filed an incident with Sirsi for further investigation.
- **Drummond/Alberton Cataloging issue:** A very elusive issue involving various cataloging activities, such as OCLC importing and editing Item info occurs at both Drummond Library and Alberton school. This issue is possibly related to the libraries' ISP, Blackfoot Communications, as these problems occur on a laptop when plugged into their networks, but disappear when the same machine is connected via another network. I have attempted contacting Blackfoot to inquire about their firewall's behavior, but

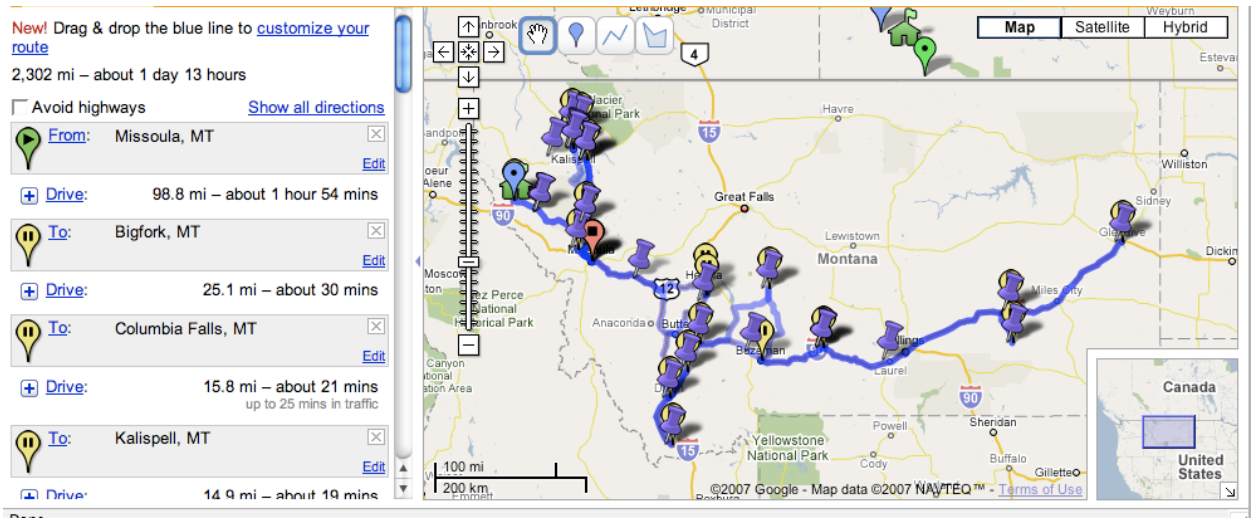
couldn't get to speak to anyone with this kind of knowledge. The necessary firewall ports are clearly open, as Workflows can connect, and further tests to verify the ports (as requested by Sirsi) worked just fine. Mike Price has opened an incident with Sirsi regarding this problem.

- **Plains Public Library - New User Registration bug:** After clicking on New User Registration, in the pop-up that follows there are two widgets: a "User ID" text field, and a "Profile Name" dropbox. At Plains Library, the "User ID" field will frequently fail to respond to keyboard or scanner input, even after clicking in the field. Clicking the "Profile Name" dropbox, choosing another entry, then clicking it again and changing it back will generally fix the "User ID" field. Sirsi should be notified of this bug.

Concluding Remarks

Anecdotally, the capability and stability of the Montana Shared Catalog have improved immensely in the last year or two. This is certainly supported by my observations this summer. While a few libraries had their problems, the great majority reported smooth sailing, and had the network stability to support it. Clearly the Montana Shared Catalog is on the right course, and with a bit more work Workflows may yet be wrestled into submission.

Thank you all for an excellent opportunity and the excellent support you've provided this summer. I look forward to future contact with all of you.



Appendix: MSC Libraries ISP Connections

Library	ISP	Conn. type	Upstream (kbit)	Downstream (kbit)
Bigfork	MT Digital	Wireless	4000	4000
Columbia Falls	MT Digital	DSL	1500	500
Flathead County Lib	MT Digital	Fiber	18000	18000
Whitefish	MT Digital	DSL	1500	500
Marion	CenturyTel	DSL	1000	500
Flathead Valley CC	Campus network	?	large	large
Twin Bridges	3 Rivers Communications	DSL	1000	500
Clancy	Bresnan	Cable	1000	500
Dillon	OneWest	DSL	500	500
Lima	3 Rivers	DSL	1000	400
Whitehall	Telesystems Services	DSL	2400	1000
Meagher County Lib	Montana In Touch	DSL	650	650
Forsyth	Rosebud County	T1	3500	3500
Colstrip	Rosebud County	T1	3500	3500
Glendive	Mid-Rivers	Cable	1400	250
Laurel	CableMT	Cable	1500	500
Big Timber Library	Triangle Telephone	DSL	650	600
Big Timber Elementary	School internet		2000	600
Sweetgrass County HS	School internet		1000	700
Belgrade	Qwest	DSL	4000	650
Drummond	Blackfoot	T1	3000	4000
Frenchtown HS	Qwest (school)	DSL	na	na
St. Ignatius HS	Blackfoot	DSL	1000	1200
Plains Schools	Blackfoot	DSL	1000	1300
Plains Public Lib	Blackfoot	DSL	700	400
Thompson Falls HS	Blackfoot	Fiber?	1400	1400
Thompson Falls Public Library	Blackfoot	DSL	4000	400
		Averages:	2448	1842